Expedient Road Construction For Logistics-Over-The-Shore Operations

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Expedient Road Construction For LOTS Operations

Objective:

- Develop Solutions for Military Road Construction Over Loose Sandy Soil and Very Soft Soil

Requirements:

- Expedient
- Reduced Logistical Footprint – Less Weight, Volume, Cost
- Support 2,000 Channelized Truck Passes

Approach:

- Evaluate Commercially-Available Materials
- Design Alternative Pavement Sections
- Evaluate Alternatives Under Full-Scale Traffic Conditions

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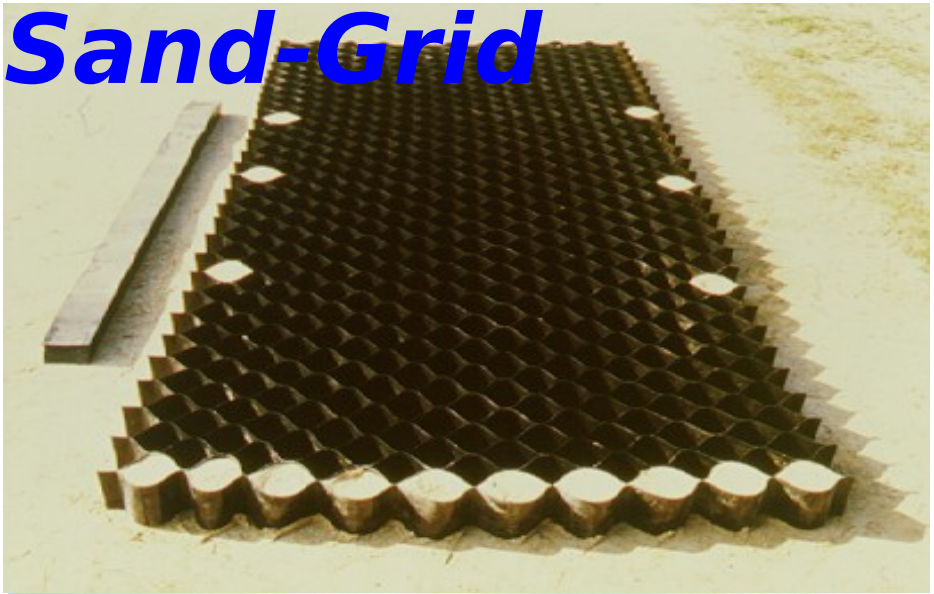
EXISTING TECHNOLOGIES

Sand-Grid



Uni-Mat

Mo-Mat

Steel Ma

NEW SANDY SOIL STABILIZATIONS

- Geofiber Stabilization
- Multi-Purpose Mat (MP Mat)
- Plastic Hexagonal Mat
  - Special
  - Allround

GEOFIBER STABILIZATION

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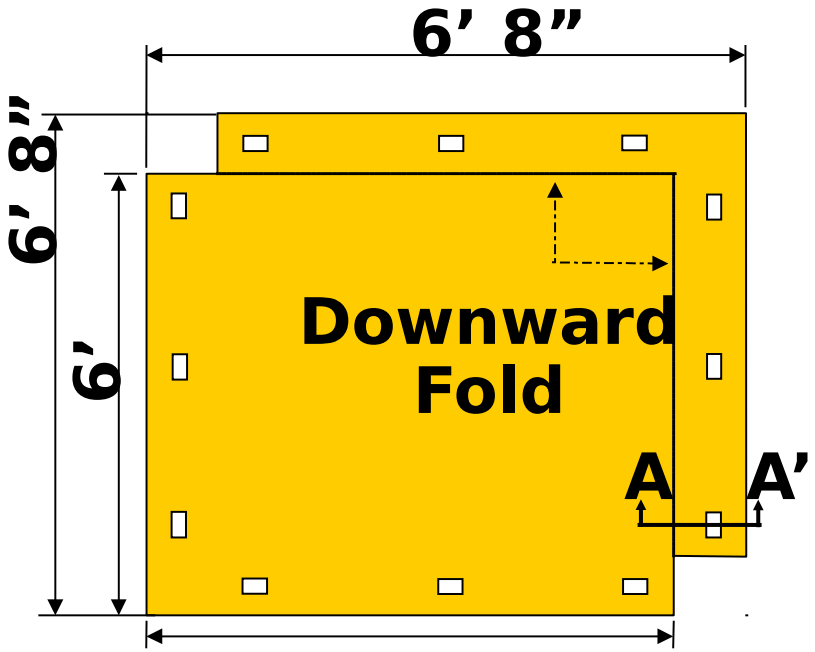
GEOFIBER STABILIZATION

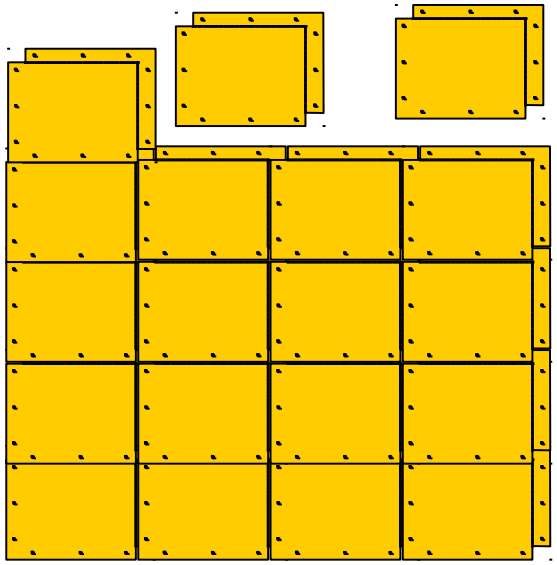
GEOFIBER STABILIZATION

- **Geofiber** stabilization is effective for **heavy traffic**
- Thickness requirement:
  - C130 aircraft - 12 in.
  - Military truck - 8 in.
- Fiber requirement:
  - C130 aircraft - 1.0% by dry weight
  - Military truck - 0.8% by dry

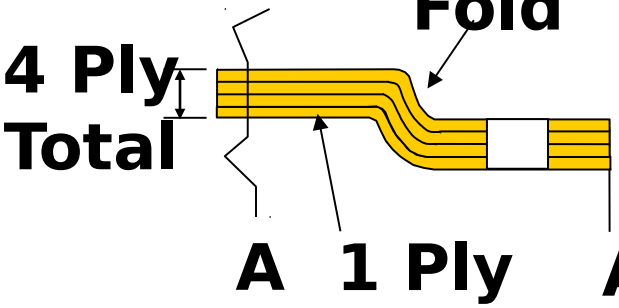
MULTI-PURPOSE MAT ROAD



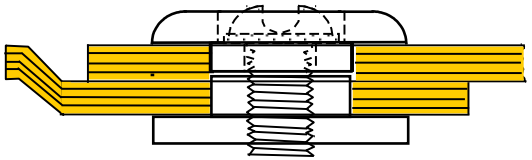
Plan View



24’ Wide Road



Section A-A’
Profile View



Mat With Pin Connecto

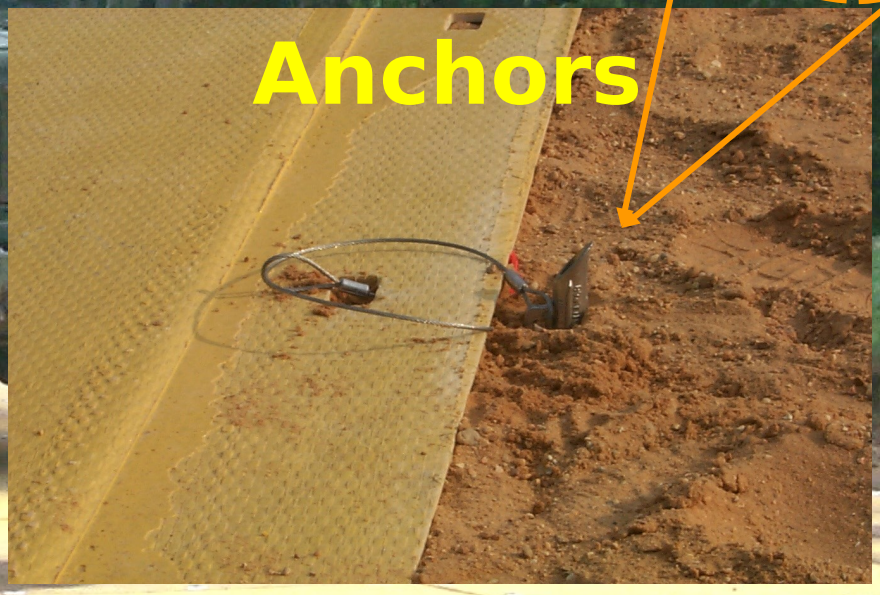
MULTI-PURPOSE MAT ROAD

MULTI-PURPOSE MAT ROAD

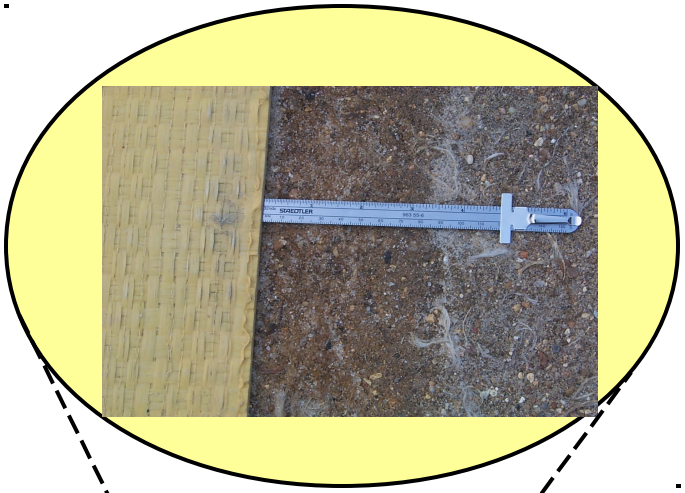
Ready for traffic

Tightening of pin connector

Anchors

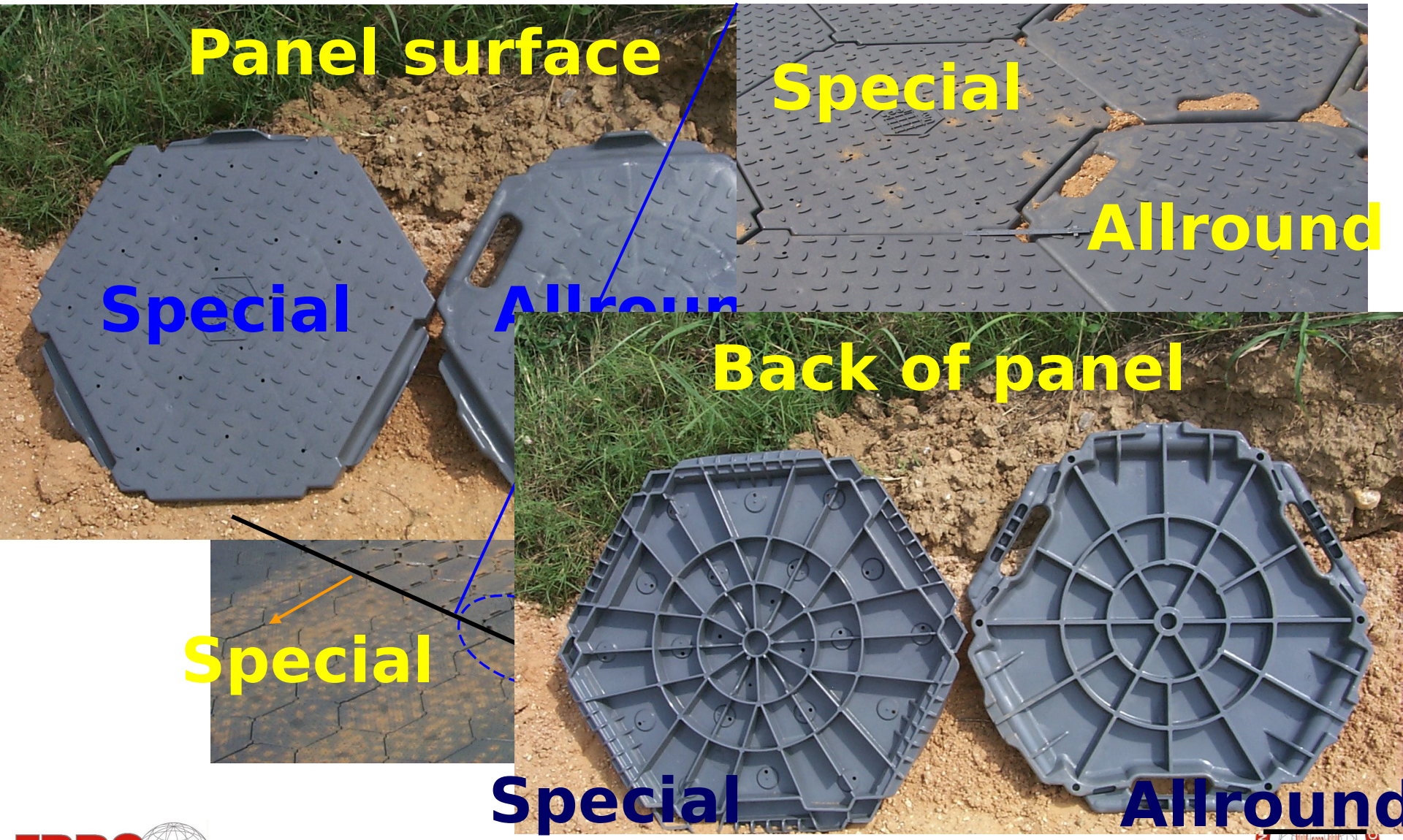


MULTI-PURPOSE MAT ROAD



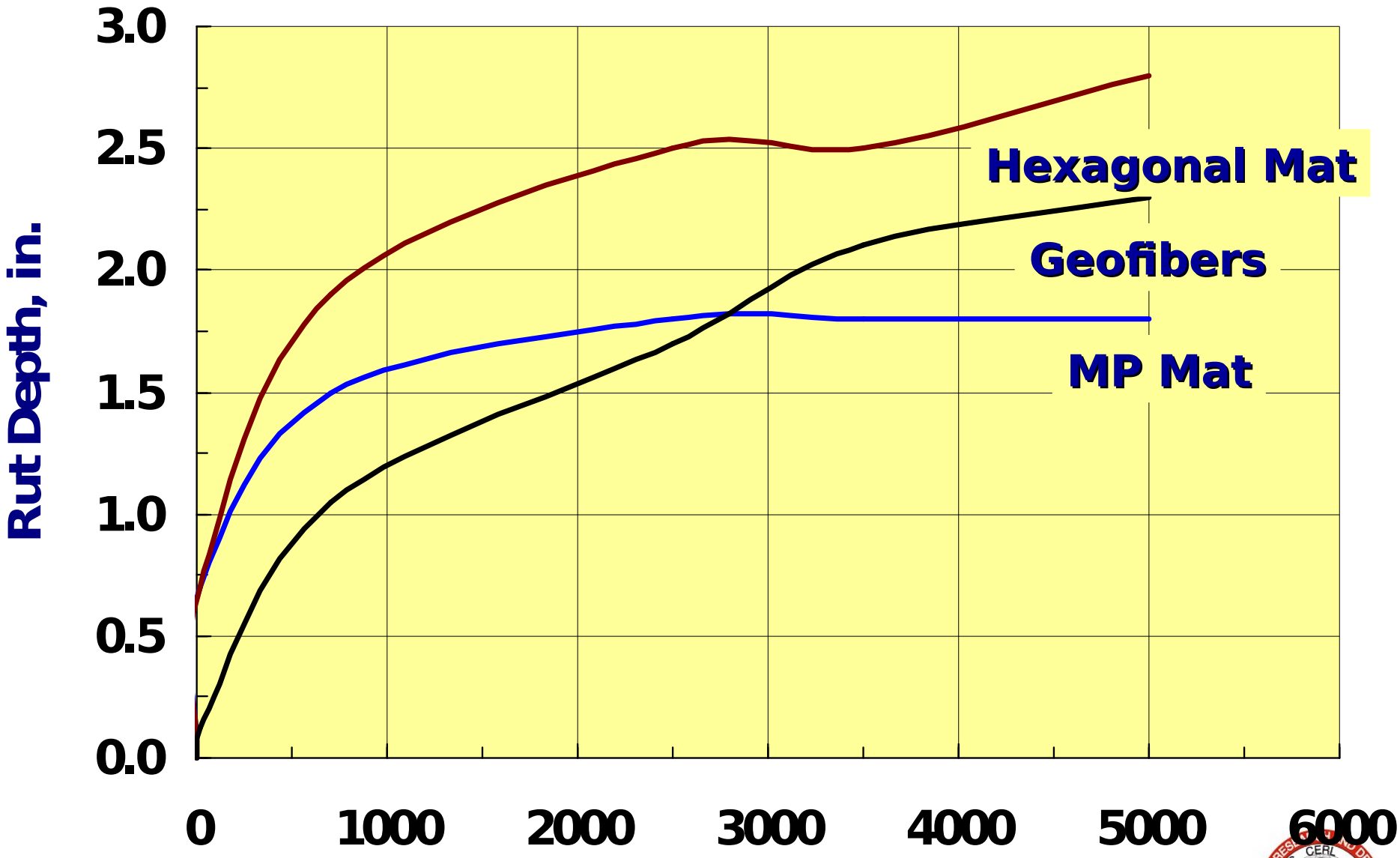
HEXAGONAL MAT ROAD

HEXAGONAL MATS



HEXAGONAL MATS

TECHNOLOGIES PERFORMANCE

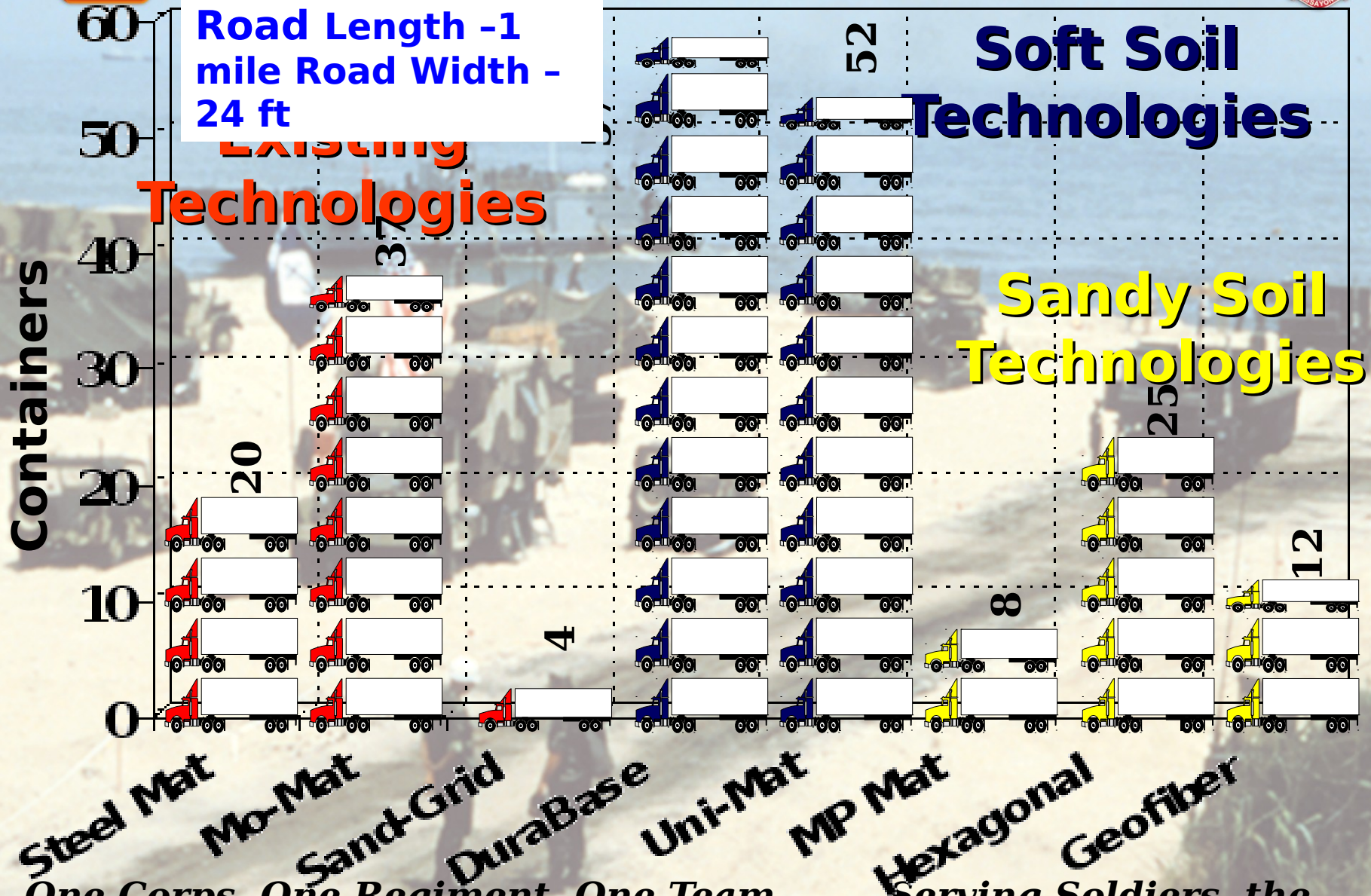


JLOTS – NATIVE ATLAS EXERCISE

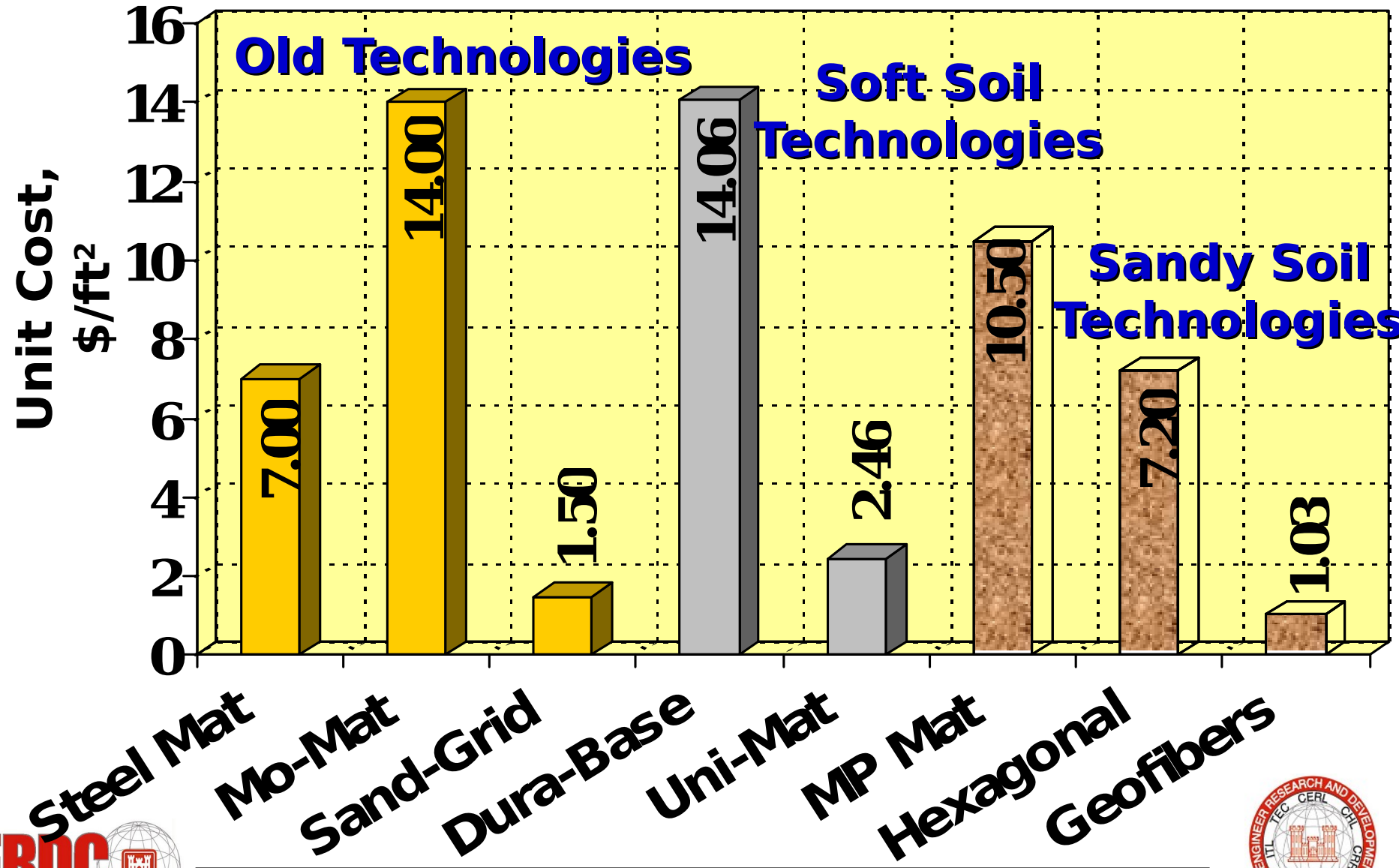
Multi-Purpose Mat Supporting 3rd ID Beach Cro

LOGISTIC ISSUES: Containers

Road Length –1 mile Road Width – 24 ft



LOGISTICS ISSUES: Unit Cost per 1 Mile of Road



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Road Construction Over Very Soft Soil

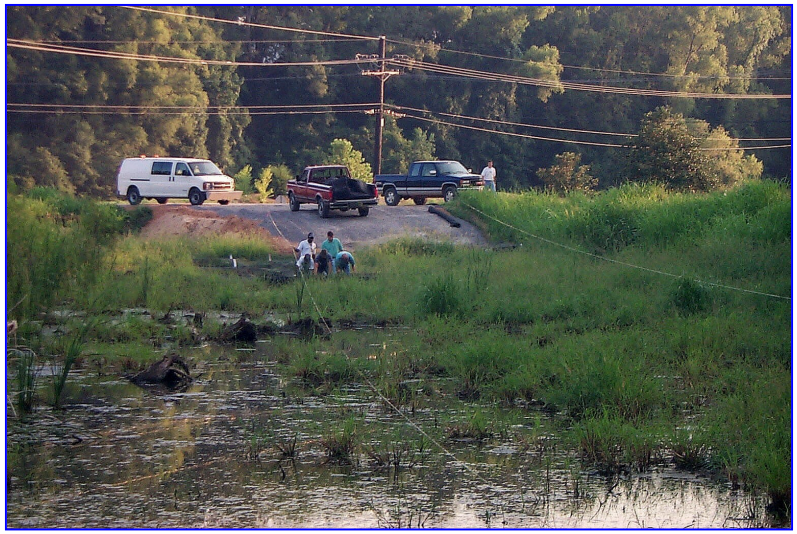
Concept Behind the Research:

Logistics-Over-The-Shore

How Soft is Very Soft Soil?

Construction Alternatives:

- Bypass Obstacle
- Use Tactical Bridging
- Remove & Replace
- Develop Expedient Road Construction

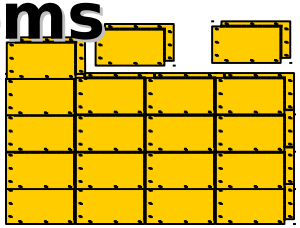


Expedient Road Construction - Approach

CONSTRUCT TEST SECTIONS TO EVALUATE:

- **Geosynthetic Road Construction Products**
  - ✓ Geotextiles
  - ✓ Geogrids
  - ✓ Geofoam
  - ✓ Geofibers
  - ✓ Excogitated Composite Multifunctional (ECM) Material

- **Expedient Mat Systems**



Multi-Purpose Mat

DURA-BASE Mat

- **Lightweight Fills**
  - ✓ Sand
  - ✓ Wood Chips

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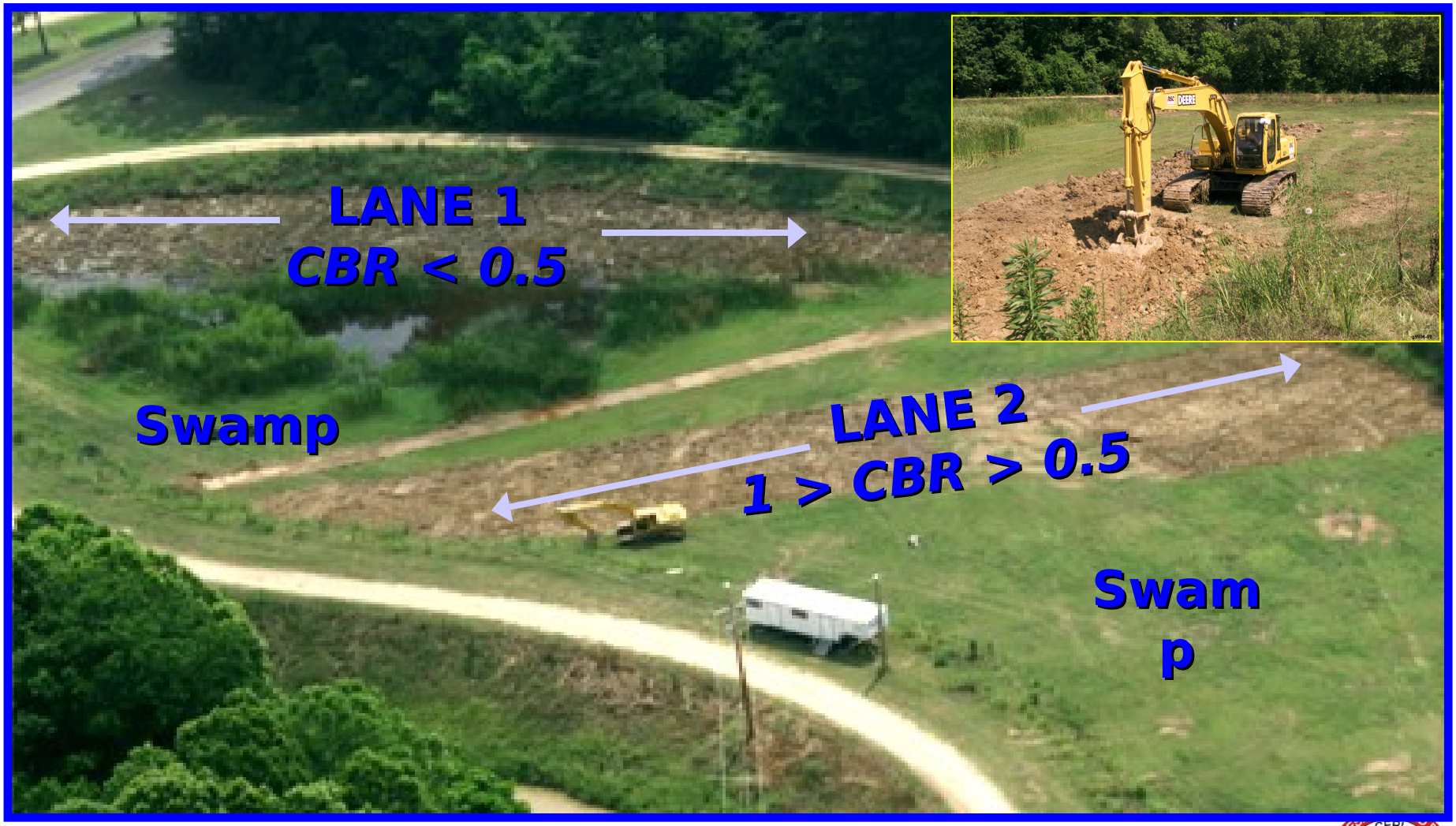
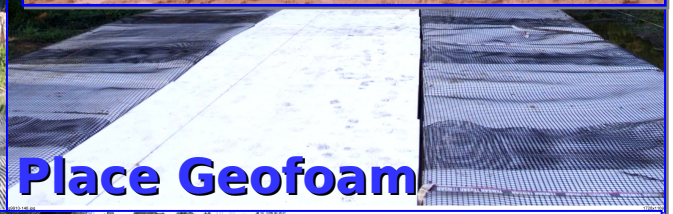
Test Section Construction

Site Preparation



Test Section Construction

Traffic Lane 1 Construction – CBR < 0.5



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Test Section Construction

Traffic Lane 2 Construction – 1 > CBR > 0.5

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Test Section Traffic

Test Traffic:

- 5-Ton Truck
- 42-Kip Gross Loa
- 2,000 Truck Pass

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SOFT SOIL CONCLUSIONS

- 2-Layers of DURA-BASE or SOLOCO's Wood Mat Can Sustain 2,000 Military Truck Passes Over a 0.5+ CBR Subgrade
- Crushed Limestone (30 in.)/Geogrid/Geotextile Can Sustain 2,000 Military Truck Passes Over a 0.5+ CBR Subgrade
- The ECM and Geofoam Products Are Not Suitable For Soft Soil Construction
- Lightweight Wood Chips Provide A Drainable Fill With Significant Load Distribution Characteristics
- Stiff Geogrids Can Be Used As Construction Platforms
- The Logistical Footprint Must Be Considered & Is Large For Soft Soils

SANDY SOIL SUMMARY

- **Four Solutions for Sandy Soil Stabilization**
  - **Geofiber Stabilization**
  - **Multi-Purpose Mat**
  - **Plastic Hexagonal Mat**
  - **Sand Grid**

- **Benefits of the New Technologies**
  - **Reduce construction time, manpower, and cost**
  - **No required special construction skills**

SOFT SOIL SUMMARY

ntial Solutions for Soft Soil Stabilization Inclu

- **Subgrades With 1 > CBR > 0.5:**
  - Crushed Stone/Geogrid/Geotextile
  - Plastic DURA-BASE Mat/Geotextile
  - Wood SOLOCO Mat/Geotextile

- **Subgrades With CBR < 0.5:**
  - Crushed Stone/Geogrid/Wood Chips*/Geotextile
  - Plastic DURA-BASE Mat/Wood Chips*/Geogrid/Geotextile
  - Wood SOLOCO Mat/Wood Chips*/Geogrid/Geotextile

* Sand May Be Substituted For Wood Chips With Limited Performance

QUESTIONS